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Chelyabinsk Iron and Steel Plant Bakal, USSR

An Imagery Research Paper

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Basic Imagery Interpretation Report

IS 78-10704K RCS-13/0013/78

August 1978

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CENTRAL INTELLIGENCE AGENCY
National Foreign Assessment Center
Office of Imagery Analysis

INSTALLATION OR ACTIVITY NAME					COUNTRY	
Chelyabinsk Iron and Steel Plant Bakal					UR	
UTM COORDINATES	GEOGRAPHIC COORDINATES	CATEGORY	BE NUMBER	COMIREX NO.	NIETB NO.	
NA	55-16-10N 061-25-43E					
MAP REFERENCE						
USATC, Series 200, Sheet 0164-3HL, 5th ed., May 77, Scale 1:200,000						
LATEST IMAGERY USED			NEGATION DATE (If required)			
			NA			

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ABSTRACT

The Chelyabinsk Iron and Steel Plant Bakal is probably the sixth largest producer of steel in the Soviet Union. The plant produced between 6,000,000 and 7,000,000 tons of steel in 1976. Plant products include steel cable, pipe, plate, sheets, bars, structural sections, ball bearings, and tool steel. An alloy steel which is apparently suitable for use in rocket and missile motor cases and chromium and molybdenum alloy steels are reportedly produced at Chelyabinsk.

Major construction at Chelyabinsk since mid-1972 has consisted of completion of a rolling mill, an addition to a rolling mill, an addition to an unidentified fabrication building, and an addition to a probable refractory brick plant. In April 1978, a large, unidentified building was in the early stage of construction and a rolling mill was being expanded.

Eight detached civil defense shelters have been identified at the iron and steel plant and two probable basement shelters were under construction in April 1978. In addition, five detached shelters have been identified at two nearby plants--four at a probable ferro-concrete products plant and one at an unidentified plant.

The information and judgments presented in this publication were derived principally from analysis of imagery. Although information from other sources has been included, this publication does not reflect an all-source assessment and has not been formally coordinated within CIA.

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This report includes a general discussion of the plant and a table listing its major facilities and civil defense shelters. The table is keyed to a photograph of the plant.

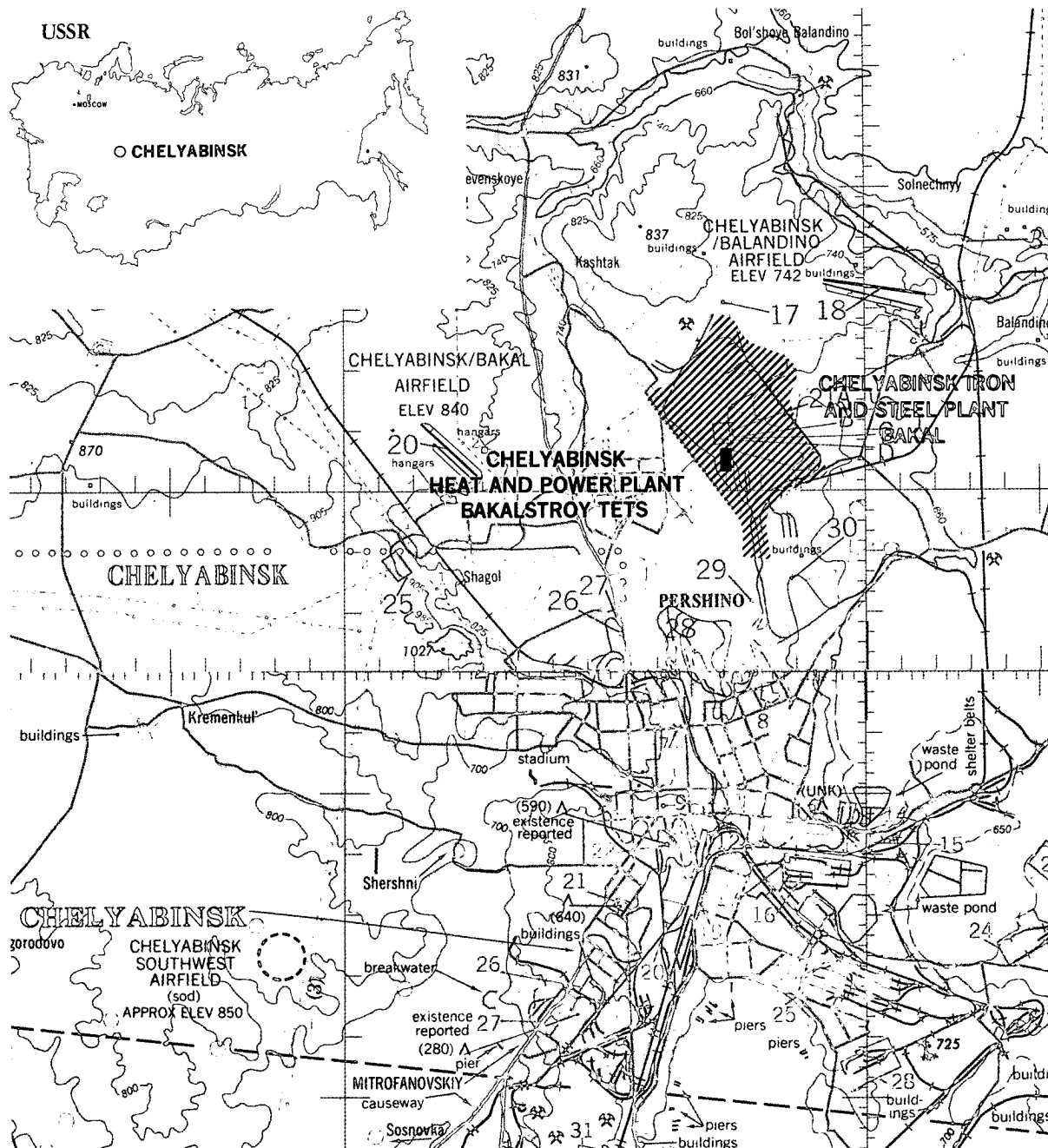


FIGURE 1. LOCATION MAP.

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INTRODUCTION

The Chelyabinsk Iron and Steel Plant Bakal is located about 2.2 kilometers east of the Miass River on the north side of the city of Chelyabinsk in Chelyabinsk Oblast (Figure 1). The plant is served by an extensive road and rail network and is secured by walls and fences. Steam and power are provided by the colocated Chelyabinsk Heat and Power Plant Bakalstroy TETS. The iron and steel plant covers an area of approximately 1,970 hectares. A probable ferro-concrete products plant and an unidentified plant are located next to the iron and steel plant.

The plant was built during 1941-42 with equipment and tools taken from plants evacuated in the west ahead of the German army. The first two blast furnaces installed at Chelyabinsk were taken from the iron and steel plant at Lipetsk. 1/ The plant began operating in 1943, and by 1978 it employed 35,000 people. 1,2/

DISCUSSION

The Chelyabinsk Iron and Steel Plant Bakal is a fully integrated iron and steel plant and is probably the sixth largest producer of steel in the USSR. 3,4/ In April 1978, the major facilities at the plant included one sintering building, a lime plant, nine coke oven batteries, five blast furnaces (the most critical components of an iron and steel plant), two open-hearth furnace buildings, one basic oxygen furnace building, two electric furnace buildings, one probable electric furnace building, and five rolling mills (Figure 2). Other facilities included a coke byproducts plant, an air separation plant, a scrap metal processing building, a slag processing plant, and a probable refractory brick plant. Several buildings at the plant could not be identified.

According to various collateral sources, plant products include steel cable, pipe, plate, sheets, bars, structural sections, ball bearings, and tool steel. 5-8/ An alloy steel which is apparently suitable for use in rocket and missile motor cases and chromium and molybdenum alloy steels are reportedly produced at Chelyabinsk. 8,9/

An unusual type of coke oven battery which lacks both a coaling tower and a larry car is located at Chelyabinsk. The lack of the tower and car indicates that the ovens may be fed crushed coal by pipeline, but this could not be confirmed on photography. A coke oven battery of this type has also been observed at the Temir-tau Metallurgical Plant Karaganda. On March 1978 photography, several ovens of another coke oven battery at Chelyabinsk appeared to be damaged and inoperable; the other ovens in the same battery were operating.

Soviet sources state that one of the blast furnaces at Chelyabinsk was remodeled during 1972-73. 10,11/ Construction activity was observed at one of the blast furnaces on imagery of October 1972.

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Soviet sources also indicate that the Chelyabinsk plant is equipped with a plasma-arc remelting furnace and nine electroslag remelting furnaces. 8/ These furnaces are used to produce high-grade special steels and could produce steel for missile or rocket motor cases. Because no photographic signatures have been found which would enable identification of buildings housing these types of furnaces, the location of the furnaces could not be determined.

Major construction at Chelyabinsk since mid-1972 has consisted of the completion of a rolling mill, an addition to a rolling mill, an addition to an unidentified fabrication building, and an addition to a probable refractory brick plant. In April 1978, a large unidentified building was in the early stage of construction. The area covered by the foundation of this new building indicates that, when completed, the building may be a rolling mill. One of the plant's rolling mills was undergoing expansion in April 1978.

Most of the major components of the plant were operating when observed on photography from 1972 to 1978. Exceptions were the blast furnace which underwent renovation in 1972 and the damaged coke ovens in 1978. The rolling mill constructed during 1972-78 appeared to be externally complete in April 1978. However, much construction equipment and activity were observed around the building in April 1978, indicating that the rolling mill probably was not ready to begin operation.

Civil Defense Measures

Eight detached civil defense shelters have been identified at the plant, and two probable basement shelters were under construction in April 1978. Five detached shelters have been identified at two nearby plants--four at a probable ferro-concrete products plant and one at an unidentified plant. Table 1 lists the shelters by type, size, association with plant facilities, location by geographic coordinates, and approximate construction date. The shelters are indicated on Figure 2.

Two structures which are similar to detached civil defense shelters are located next to two induced-draft cooling towers in the north corner of the plant. The structures were built before February 1971 but have never been covered with earth as shelters normally are. Although they may simply provide access to underground equipment at the cooling towers, these structures probably could be used for protection if necessary. The structures were not observed at any other cooling towers at the plant.

There is no photographic evidence indicating efforts to protect or "harden" production facilities at the plant. Hardening measures taken inside buildings for the protection of equipment obviously would not be observable on overhead photography. Some storage tanks within the plant have been buried, but this is a normal safety measure.

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Table 1. Major Facilities at Chelyabinsk Iron and Steel Plant (Cont'd to Figure 2)			
Item	Facility	Roof Cover (sq m)	Remarks
<u>Raw Materials Processing</u>			
1	Sintering building	2,085	Fuses particles of iron ore, limestone, and coke into sinter for use in blast furnaces.
2	Coke and coke byproducts plant		Contains nine coke oven batteries and equipment for processing coke byproducts.
3	Line plant		Contains two rotary kilns and six vertical kilns. Processes limestone for use in blast furnaces and steel-making furnaces. May also produce cement.
<u>Iron Production</u>			
4	Blast furnaces		Five blast furnaces in a row 560 meters long centered on coordinates 55-15-44N 061-25-05E. Two furnaces have a volume of 330 cubic meters, two have a volume of 1,086 cubic meters, and one has a volume of 1,719 cubic meters. 13/
5	Pig iron casting building		Two casting strands.
6	Pig iron casting building		Two casting strands.
7	Iron foundry	16,880	
<u>Steel Production</u>			
8	Open-hearth furnace building	13,055	Contains at least five furnaces.
9	Open-hearth furnace building	22,765	Contains at least six furnaces.
10	Electric furnace building	26,345	
11	Electric furnace building	15,990	
12	Probable electric furnace building	16,510	
13	Basic oxygen furnace building	23,370	Contains three 110-ton furnaces. 13/
<u>Rolled Steel Production</u>			
14	Rolling mill	291,555	
15	Rolling mill	67,855	
16	Rolling mill	235,795	
	Addition under construction	35,210	
17	Rolling mill	168,065	Produces blooms, billets, bars, rounds, and squares. 13/
18	Rolling mill	66,965	Produces blooms, billets, and bars. 13/
<u>Miscellaneous</u>			
19	Unidentified fabrication building	83,110	
20	Air separation plant		Produces oxygen for use in blast furnaces and steel-making furnaces.
21	Scrap metal processing building	17,795	Prepares scrap metal for use in steel-making furnaces.
22	Slag processing plant		
23	Unidentified fabrication building	15,530	
24	Unidentified fabrication building	22,715	
25	Unidentified building under construction	169,790 (estimated)	Possible rolling mill.
26	Probable refractory brick plant		
27	Raw materials storage area		
<u>Power</u>			
28	Thermal power plant	18,290	200-megawatt capacity. 15/

Civil Defense Shelters

Item	Type	Association	Floor Space (sq m)	Geographic Coordinates	Dates First Seen Under Construction	Completed
29	Detached	Rolling mill	504	55-16-45N 061-25-26E	January 1974	June 1975
30	Probable	Rolling mill basement	1,296	55-17-03N 061-26-25E	April 1978	
31	Detached	Rolling mill	576	55-16-38N 061-25-47E	September 1976	June 1977
32	Detached	Rolling mill	504	55-16-19N 061-25-03E	April 1973	January 1974
33	Detached	Unidentified building	504	55-16-07N 061-25-27E	June 1975	August 1975
34	Detached	Unidentified building	567	55-16-44N 061-25-30E		February 1972
35	Probable	Unidentified basement	756	55-15-47N 061-25-15E	April 1978	
36	Detached	Coke production area	378	55-16-02N 061-26-45E	April 1973	January 1974
37	Detached	Unidentified building	567	55-15-25N 061-26-00E		February 1972
38	Detached	Locomotive maintenance building	576	55-15-16N 061-25-00E	August 1975	March 1976
39*	Detached	Unidentified building	378	55-15-15N 061-24-47E	February 1972	October 1972
40*	Detached	Unidentified building	648	55-15-16N 061-24-46E	February 1972	October 1972
41*	Detached	Unidentified building	441	55-14-55N 061-24-30E	February 1972	October 1972
42*	Detached	Unidentified with ramp building	1,512	55-14-45N 061-25-07E	September 1976	June 1977
43*	Detached	Unidentified building	169	55-14-50N 061-27-17E		February 1972

*Located in nearby plants

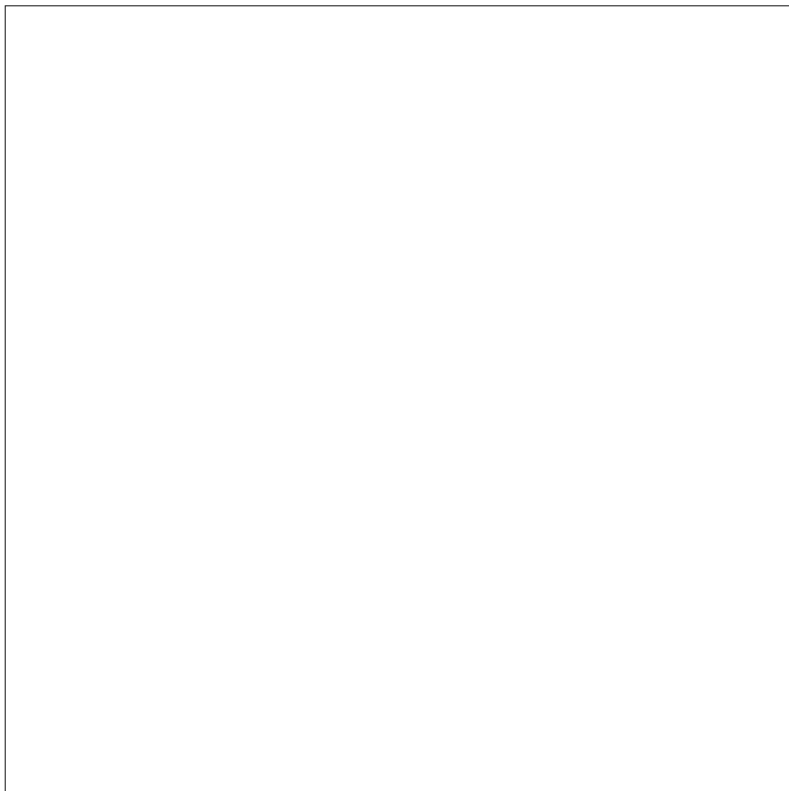
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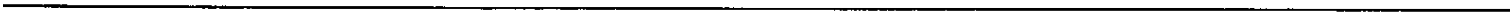
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The author of this paper is [REDACTED] of the Economic Resources Division, Office of Imagery Analysis. Comments and queries are welcome and should be directed to [REDACTED]

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